

The Diagnosis of Early Breast Cancer

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THE successful diagnosis of early, curable mammary carcinoma is governed by a multitude of complex factors which involve much more than symptoms and the refinements of physical examination. This paper is an attempt to touch briefly on the many other important related factors which are being developed, such as special technical examinations, information concerning the importance of heredity, and the relation of specific benign breast lesions to malignant lesions. Mention should be made also of the frequently unappreciated subject of patient psychology.

In the majority of cases, diagnosis of early cancer of the breast is not possible because the patient inadvertently neglects to afford the physician the opportunity. Numerous observers^{2,3,9} report an incidence of axillary metastases at the time of operation in from 65 to 72 per cent of their patients. Immediately the question arises as to why such a preponderance of patients with easily palpable carcinomas in such an accessible organ as the breast came to operation with metastatic disease. The paradox led the author to investigate several of the causes.

Careful interrogation as to the first manifestation of mammary cancer revealed the startling information that over 75 per cent of the patients first noted their breast tumor by *accident*, usually while dressing or bathing. Further questioning revealed that women rarely examine or palpate their breasts routinely. Obviously, then, inasmuch as the early breast lesion is painless, metastases to the axillary nodes can occur long before the cancer is large enough to be detected by accident. It is equally obvious that the tumor must of necessity attain rather large dimensions before the unsuspecting patient will inadvertently note its presence. In this respect, it is significant and tragic that the average size of the tumor exceeds 2 cm. in diameter in 91 per cent of patients.

The second tragic aspect of the situation is the long interval of delay between the discovery of the tumor and the first visit to a physician. The average duration of symptoms before medical examination was 15 months in a series of 1,000 cases of mammary cancer studied by Wevill,¹¹ while Nathanson⁷ found the average duration of symptoms to be 12 months. Generally, the greater proportion of patients delayed medical consultation for six months or longer. The relation of long delay to poor prognosis is evident when the percentage of five-year survivals is calculated for each pathologic type of cancer. Further, it is possible to correlate both the size of the tumor and

the duration of symptoms with the percentage of five-year survivals, and thereby impressively emphasize the consequences of neglect of self-examination and procrastination in seeking medical advice, which operate jointly to deny the physician an opportunity of early diagnosis. Geschickter,³ for example, has noted that the size of the cancer and the number of patients who failed to survive the five-year period, increased in proportion to the duration of symptoms. In his series of infiltrating adenocarcinomas, a study of the most favorable group of patients with a five-year survival rate of 73.5 per cent showed the average tumor size was 1 to 1.5 cm. in diameter and the average duration of symptoms was three months. In the most unfavorable group with a low (9.3 per cent) five-year survival rate, the average size of the tumor was 7.8 cm. and the average duration of symptoms was 14 months.

SHOULD STRESS SELF-EXAMINATION

Unfortunately, future technical advances in early diagnosis of mammary cancer will not materially affect the high mortality rate of this group of women whose advanced disease is directly attributable to their ignorance of self-examination and their long procrastination in seeking medical advice. It is essential, therefore, for every physician to examine routinely the breasts of all female patients over the age of 30, regardless of their chief complaint, and to instruct them in the technique of self-examination. It would also be advisable to stress self-examination of the breasts in all cancer education programs. Unquestionably, the prime motivating factor which induces many women to postpone medical consultation after the onset of symptoms, is *fear*. This fear of cancer, which is widely prevalent, often impairs the reason and better judgment of the patient and leads her into a state of self-delusion in which she can comfortably evade the truth temporarily. Therefore, cancer education programs should emphasize the hope and promise inherent in the relatively high survival rates not only in the favorable types of carcinoma, but in the less favorable types, if they are diagnosed early.

If the foregoing observations are accepted as major causative factors, which partially explain the high incidence of advanced breast cancer, it is proper to assume that popular education is the answer to the problem, if it is intelligently coordinated by all physicians and such organizations as the American Cancer Society. There is evidence in the medical literature that cancer programs are operating to increase the number of women who are presenting themselves for treatment with early cancer of the breast. In the past few years, the corrected cancer mortality figures for California indicate that the death rate for all

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types of cancer in women has started to decline, while the rate for men continues to increase. The predominantly female attendance at all cancer forums and women's ready acceptance of cancer literature may be a partial explanation.

The medical history of the patient is extremely important whether she presents herself with a specific breast complaint or not. A family history, for example, of breast carcinoma should alert the examining physician, and with good reason. MacDonald⁶ in a review of 2,636 cases of mammary cancer found that the relatives of these patients developed breast cancer three times more frequently than the control population. Wood,¹² in one of the few medical documents which might tenuously relate the Bittner milk factor to a similar factor in human mammary cancer, traced a family through four generations and found several female members who developed bilateral cancer of the breast. Breast cancer occurred only in those female members who had been nursed by their mothers. However, it cannot be too strongly emphasized that there is no evidence as yet of a similar, virus-like factor present in human milk. Nevertheless, it may be prudent to caution against the nursing of a female child by a mother who has had one breast amputated for carcinoma, and who has a definite family history of mammary carcinoma.

The history of slow, progressive growth in a breast tumor is ominous and should indicate the course of action to the physician. Sudden disappearance, or rapid subsidence, of a mass is suggestive of a cyst with rupture. Rapid onset and growth associated with tenderness and increased local skin temperature usually signifies an infection, but may be a lethal "inflammatory" carcinoma. As a rule, early breast carcinoma is painless and symptomless. This insidious characteristic leads many patients to minimize their breast tumors, because popular conception invariably associates cancer with pain.

NIPPLE BLEEDING

Nipple bleeding or discharge is more often associated with such benign lesions as adenosis and intracystic papillomas. The incidence of breast cancer associated with nipple bleeding, but *without a palpable tumor*, ranges about 4 per cent, according to several publications. These low percentage figures are deceiving to a dangerous degree because they do not emphasize the other ominous aspect of nipple bleeding associated *with a palpable mass*, and which is associated with a high incidence of cancer. Proper evaluation of nipple bleeding in a breast without a palpable tumor necessitates all the refinements of examination such as transillumination, localization of affected ducts by means of probes and digital massage, and microscopic examination of the discharge for red blood cells. Biopsy and the treatment of such cases may be better accomplished if the surgeon is aware of the multiplicity of intracystic papillomas (15 to 20 per cent) in the same breast, and the potential malignancy of both intracystic papillomas and adenosis.

The principles of physical examination of the

breast which aid in the diagnosis of early lesions are limited. Very often, the examining physician can do little more than detect, or confirm, the presence of the tumor. In the final analysis, only the pathologist can accurately state if the lesion is or is not cancer.

If cancer of the breast, and such etiologically associated benign lesions as chronic mastitis, are properly appreciated as processes which are not static, the physician who foregoes biopsy for observation should then endeavor at least to obtain a "motion" picture of the process with three-month to six-month reexaminations. If the original lesion has been carefully measured, described and plotted in an anatomical diagram of the breast, slight but significant changes may be detected as early warnings. These precautions may enable one to diagnose an early carcinoma which was not palpable in the initial examination, or to detect the development of carcinoma in an area of adenosis or mastitis.

In the latter respect, the recent medical literature offers some evidence that breast cancer is more common in women with a history of benign mammary lesions. Warren¹⁰ states that there is 4.5 times as much carcinoma in the group with chronic mastitis and chronic cystic mastitis as in the normal population. The incidence was 11.7 times higher when this general group was restricted to age groups between 30 and 49 years.

PHYSICAL EXAMINATION OF THE BREASTS

The development of refinements in the actual physical examination of the breasts has been more or less static for the past decade. Generally, too much emphasis has been placed on the signs of obvious, advanced breast cancer, and too little stress has been made on the minimal signs of early, curable cancer.

Physical examination is best performed with the patient both in the sitting and the reclining positions. During inspection in the sitting position, the breasts are carefully compared for contour and symmetry. Not infrequently, the infiltrating type of carcinoma may be detected beneath an area of minimal depression in the subcutaneous tissues. Extension of the arms over the head in this position may serve to accentuate any skin attachment present. Slight fullness may indicate an underlying benign lesion, or a circumscribed type of carcinoma. Comparison of the horizontal level of the nipples often may reveal a slight cephalad elevation of one nipple which can precede actual nipple retraction by several months. A localized dilatation of superficial veins or a minimal degree of infraclavicular edema may be significant. However, these are usually late signs. Nipple retraction and "pig-skin" appearance of the skin also are late developments, and in a small percentage of cases can be duplicated closely by suppurative mastitis.

Palpation of the breasts should also be performed with the patient in the sitting and reclining positions if the tumor size, shape, mobility, and consistency are to be accurately appraised. Tumors which are easily palpable in one body position may be difficult

to locate when the patient assumes the alternate position. The consistency of the mass is more efficiently studied in the sitting position where it can be examined bimanually. Breast cysts particularly lend themselves to this type of examination. Early skin attachment may be elicited by lifting or displacing the skin overlying the mass. Palpation should also include gentle digital massage over all quadrants close to the areola in order to localize and empty any ducts distended with blood or discharge. Often it is advisable to indelibly mark the skin over the exact meridian of such distended ducts, in the event a lacrymal probe or needle cannot be passed through the nipple orifice into the duct during surgery.

TRANSILLUMINATION AN AID IN DIAGNOSIS

Transillumination of the breast substance with cold light is a useful aid in diagnosis. The most effective light, is a small, single focus beam which is rheostat controlled, and is directed up from beneath the breast. Ducts which are distended with blood can be localized for operation, and translucent cysts may be differentiated from solid tumors.

Needle aspiration is also a useful aid but may prove a misleading procedure unless its limitations are appreciated. Aspiration of clear fluid from a breast tumor merely confirms the presence of a cyst. Contrary to accepted opinion, intracystic papillomas and intracystic carcinomas often contain clear fluid and not bloody fluid. Aspiration biopsy in the hands of an expert is an accurate procedure, if the biopsy is interpreted by a pathologist familiar with the method. Pathological interpretation is simplified if the clot of tissue is placed intact on a square of ordinary blotter paper, dropped in formalin, and handled as a paraffin block. Smearing the needle clot between glass slides invariably distorts the tissue architecture. A negative aspiration biopsy is meaningless inasmuch as the variables in technique are many. Added to these variables is the chance that the small needle section may not include a small focus of carcinoma buried in a mass of mastitis. However, the author has found the technique valuable in two recent patients. Both were young women who suddenly developed a breast tumor associated with tenderness, nipple retraction and "pig-skin" edema. Aspiration biopsy yielded purulent material, and both lesions quickly responded to sulfadiazine therapy.

In the final analysis, wide surgical excision and biopsy of the mass *in toto* is the one method which eliminates most of the unfavorable variables inherent in the procedures above. Safe and wide surgical excision is facilitated if an elliptical skin incision is made and used for traction, rather than a linear incision down to, or into, the mass. "Wedge" biopsy or segmental biopsy is mentioned merely to point out the hazard of entirely missing an area of carcinoma in a mass of adenosis or mastitis. Excision of the mass in its entirety conforms with the observation of Warren¹⁰ that "it is not uncommon to find carcinoma in breast tissue which had not been palpated by the surgeon entirely aside from the cyst which led to the operation."

With these thoughts in mind then, it is difficult to subscribe to the "wait and see" school of thought. At this point it is relevant to enter a plea for early biopsy in three special categories of patients. In the first group are patients with a mass in the inner (medial) hemisphere of the breast. Bartlett,¹ in his great contribution to the subject, has shown that breast cancer medial to the nipple line metastasizes rather early through the perforating internal mammary vessels into the mediastinum. His five-year survival for lesions limited to the inner hemispheres was 47 per cent, as compared to 77 per cent for lesions in the outer quadrants of the breast. It is equally important to examine carefully the breasts of pregnant and lactating women every month, and to biopsy any suspicious mass without delay. Such action may constitute the only hope for this group of women whose five-year survival rate ranges from zero in MacCarty's series⁸ to 19 per cent in Geschickter's series. The same vigilant observation should be exercised with patients who previously have had cancer in one breast, inasmuch as Kilgore⁴ has reported an incidence of 7.5 per cent of bilateral mammary cancer in this group.

RADIOACTIVE PHOSPHOROUS IN DIAGNOSIS

This paper would not be complete without mention of a new diagnostic method reported by a group at the University of California.⁵ These observers have shown that intravenously administered radioactive phosphorous concentrates selectively in breast cancer. Postoperative determinations of radioactivity in the surgical specimens revealed five to ten times greater concentrations in breast carcinoma than in benign tumors, inflammatory lesions and the normal breast tissues. Each patient received 300 to 500 microcuries of radioactive phosphorous 24 to 48 hours before the operation. Preoperative measurements of radioactivity in both breasts were then made by moving a Geiger counter over the skin. If the breast tumor was not too deeply situated and could be brought within a short distance of the Geiger counter, carcinoma could be diagnosed with a fair degree of accuracy. Thus far, the method has diagnosed metastases in axillary nodes and detected one early carcinoma developing in an intracystic papilloma. Although the procedure is still in the experimental stage, it shows great promise. It may well be one of the answers to the problem of diagnosing and locating early, barely palpable, breast cancers.

SUMMARY

The refinements of physical examination and special technical examinations for the diagnosis of early breast cancer are presented. Emphasis is placed on early detection, rather than on late "textbook" manifestations.

Two major characteristics of patient behavior which operate to deny physicians an opportunity of early diagnosis are reported. These two factors are: (a) failure in periodic self-examination of the breasts and (b) procrastination in seeking medical advice after discovery of the tumor. Both factors can be

corrected by physician education of the patient with a resultant lowering of the present high incidence of axillary metastases in 65 to 72 per cent of patients at the time of operation.

The relation of hereditary elements and specific benign breast lesions to the development of mammary cancer is reemphasized.

Early biopsy of specific breast lesions is stressed, and the limitations of aspiration biopsy and "wedge" biopsy are outlined.

The monthly examination of the breasts of pregnant women and lactating women is urged as the one hope for improving the poor prognosis of this group when breast cancer develops.

The recent use of intravenous radioactive phosphorous in the diagnosis of breast cancer is described.

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QUESTIONS AND ANSWERS

DR. McCARTHY: Question: "What statistics are there on the castration of women in the childbearing age for the alleviation of symptoms of cancer of the breast?"

Dr. Horsley of Virginia has routinely performed a bilateral oophorectomy with radical mastectomy in all his premenopausal patients with breast cancer. He published a preliminary report in *Surgery* in April, 1944, which included 25 cases. In this series, 23 patients were alive and well at the time of publication. However, the follow-up interval was too short in most cases to be conclusive.* Nevertheless, I would like to emphasize two well established facts which lend sup-

* *Author's Note:* A more recent and conclusive sequel has been reported by Dr. Guy W. Horsley in *Annals of Surgery*, 125:703, June, 1947. His five-year survival rate with oophorectomy was 76.9 per cent, as compared with a five-year survival rate of 43.5 per cent in cases treated with radical mastectomy alone.

port to the logic of castration, and which definitely relate ovarian hormones to breast cancer development and behavior. First, mammary cancer rarely develops in women who have been castrated for various other medical reasons; and finally, it has been shown that "inflammatory" cancer of the breast, which is the most aggressive and lethal type, is five times more common in pregnant women.

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